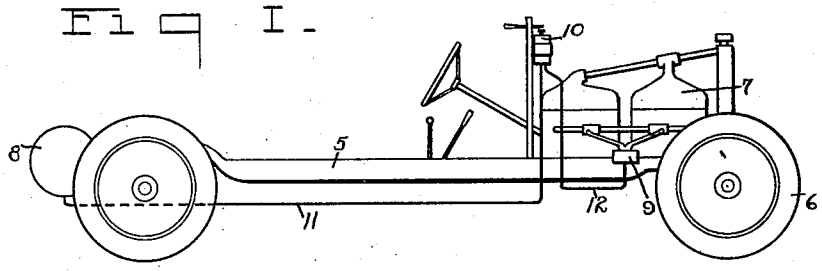
Dec. 17, 1929. C. H. BRASELTON ET AL 1,739,944

PUMP

Original Filed Feb. 20, 1922

Fig I.



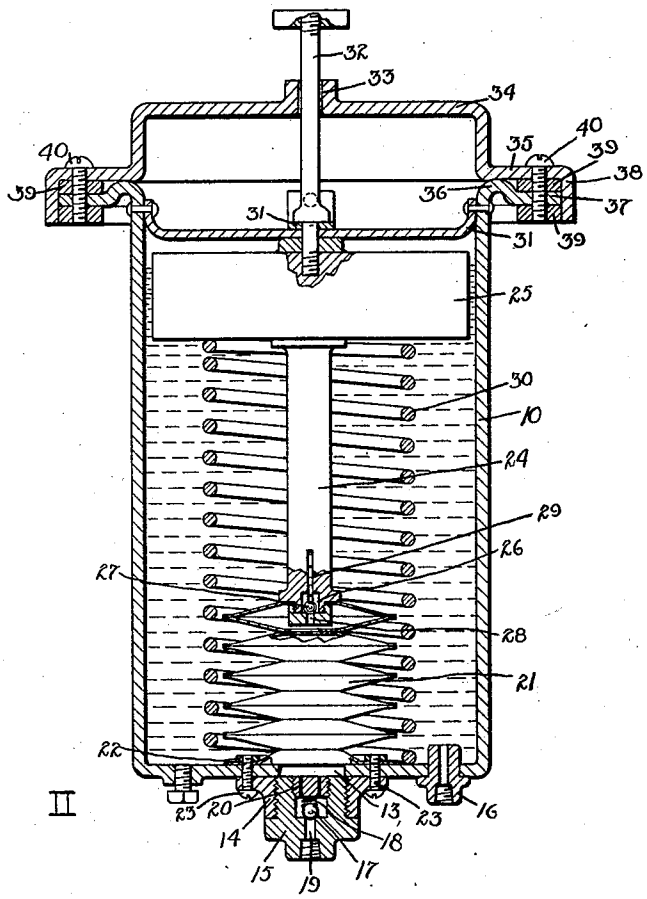


Fig II

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1,739,944

UNITED STATES PATENT OFFICE

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PUMP

Application filed February 20, 1922, Serial No. 537,682. Renewed September 14, 1928.

This invention relates to improvements in liquid fuel feed apparatus of the type adapted to be operated by vibrations imparted to the device, and has for its principal object the provision of vibration-operated means for supplying liquid fuel for internal combustion engines from a container at a lower level than the engine carburetor to a tank mounted above the carburetor level.

Other objects and advantages will be apparent from the following description in which reference is had to the accompanying drawing forming a part of this specification and in which similar reference numerals designate similar parts throughout the several views.

In the drawings Figure I is a diagrammatic side elevation of an automobile equipped with our improved apparatus.

Figure II is a central longitudinal section through the auxiliary tank and vibration-operated pumping mechanism.

Referring now to the drawings the numeral 5 designates the chassis of the automobile having the usual wheels 6, engine 7, rear fuel supply tank 8, carburetor 9, and our improved auxiliary tank 10 housing the pumping mechanism. The auxiliary tank 10 is connected with the rear supply tank 8 by means of a feed pipe 11 and with the carburetor 9 by the feed pipe 12. The tank 10 is preferably cylindrical and is provided in its lower wall with an opening 13 about which is aligned a threaded collar 14 for the reception of a valve mechanism 15 in the lower extremity of which the feed pipe 11 is adapted to be connected. The feed pipe 12 is connected at one extremity to the carburetor 9 and at the other extremity with the apertured bushing 16 fitted into the floor of the tank with its inner extremity raised a slight distance above the floor to prevent admission of sediment, water, etc. that might collect in the tank 10 into the aperture. The valve 15 may be of any desired construction, and it is to be understood that the valve herein illustrated is for purposes of exemplification only. As herein shown a ball 17 seats by its own weight and with the aid of the auxiliary spring 18 against the upper extremity of the central aperture 19 of the valve. The chamber surrounding the ball 17 is connected through a series of small apertures 20 with the interior of the tank 10. With this construction the ball 17 prevents the flow of liquid from the auxiliary tank 10 to the rear tank 8 but may be raised by suction so as to admit fuel from the supply tank 8 into the auxiliary tank. To secure the desired suction we preferably provide a bellows 21 herein shown as constructed of a series of centrally apertured discs secured in pairs with the outer edges of each pair soldered together or otherwise fastened so as to have an air tight fit. Adjacent pairs are connected by soldering or the like in proximity to the apertures through the discs. The lowermost disc is securely held in contact with the floor of the tank 10 by means of a collar 22 secured by bolts 23 or any other desired manner. The uppermost disc of the bellows is connected with the plunger 24 of the inertia member 25 so that vibratory movements of the inertia member will be directly imparted to the bellows apertures. This downward movement of the inertia member 25 will tend to press the discs 21 together exerting a pressure upon a ball 17 to more firmly seat the same, while an upward movement of the inertia member will elongate the bellows apparatus so as to create a suction which raises the ball 17 from its seat and draws in liquid from the supply tank 8 through the feed pipe 11 into the bellows device. The next downward stroke of the inertia member will compress the bellows and eject the liquid therein through the valve 26 formed at the lower end of the plunger 24. The valve 26 may be of any desired form and is herein shown as comprising a usual ball valve, the ball 27 seating normally in position to close the aperture 28 leading into the ball chamber while the upper aperture 29 leads from said chamber into the interior of the tank 10. For convenience in construction the upper aperture is formed merely as a slot cut through the lower portion of the plunger 24 and the ball chamber is a circular enlargement of the lower extremity of the slot. The lower aperture 28 is formed in a separate member which may be threaded or otherwise

secured upon the plunger 24. The illustrated construction provides a threaded lower extremity on the plunger 24 of lesser diameter than the remainder thereof, thereby giving a shoulder against which the upper disc of the bellows 21 may be pressed by the turning of the apertured cap on the threaded projection.

The inertia member 25 preferably enclosing a relatively large weight of but slightly less diameter than the interior of the tank 10 which is normally held in raised position by a main spring 30 extending between the lower surface of the weight and the floor of the tank 10. For the purpose of centering the weight and plunger 24, as well as to provide a damping means to check the upward movement of the inertia member, we preferably provide a plurality of leaf springs 31 secured at their extremities to the sides of the tank 10 and arranged diametrically across the tank. At their intersections the leaf springs 31 are apertured for the reception of the guide rod 32 secured at its lower extremity centrally of the weight 25 and with its upper portion projecting through the central aperture 33 of the cap 34. The aperture 33 is of slightly greater diameter than the guide rod and the leaf springs 31 may bend sufficiently to enable a substantially accurate centering of the entire pumping mechanism. To aid in such centering we preferably construct the cap 34 with a raised central portion having an exterior flange 35 adapted to seat upon the head 36 formed by bending the upper portion of the tank 10 into substantially the position shown in Figure II. Exteriorly of the bead 36 said tank portion is formed with the extension flange 37 adapted to be accurately machined into a true circle with the center of the tank as its center. The cap flange 35 is further formed with the down turned circular flange 38 the interior wall of which may also be accurately machined so that it will snugly fit over the periphery of the tank flange 37. This construction also lends itself to convenient assembly. Washers 39 of cork or any desired material being inserted above and below the flange 37 and held in place by the same screws 40 that lock the cap 34 in position.

The operation of our improved device is believed to be apparent from the foregoing description. As a vehicle equipped therewith travels over the road it is subjected to constant vibration which moves the tank 10 relatively to the inertia mechanism 25, which because of its relatively great mass is slower to vibrate and tends to remain in a fixed position. The upward movement of the tank relatively to the inertia mechanism will tend to compress the bellows mechanism, while a downward movement of the tank will tend to elongate the bellows so as to create a suction and draw liquid fuel from the supply tank 8 into the auxiliary tank 10. The next upward movement of the tank will tend to eject a portion of such liquid from the bellows into the tank 10. This drawing in of liquid will continue until the tank 10 is filled to a height substantially the same as that shown in Figure II, whereupon the liquid almost entirely fills the space between the periphery of the weight 25 and the wall of the tank. In this position the friction is sufficient to prevent relative movement of the tank wall and the inertia element and further vibrations will merely move the two mechanisms simultaneously. Liquid from the tank 10 will continue to feed by gravity through the supply pipe 12 into the carburetor 9 and when the engine consumption has been sufficient to lower the liquid level in the tank 10 to a height below the weight 25 the relative motions of the tank 10 and the inertia mechanism will again draw out liquid from the supply tank 8, thus maintaining the level of the fuel in the auxiliary tank at substantially a constant level.

This invention is a modification of the invention illustrated and described in our copending application, Serial No. 533,493, filed February 1, 1922.

Having described our invention what we claim is:

1. In fuel feed apparatus a supply tank, an auxiliary tank at a higher level than the supply tank, vibration operated pumping mechanism for drawing liquid from the supply tank into the auxiliary tank, an inertia mechanism freely mounted within the auxiliary tank, valves suitably arranged to admit liquid into the auxiliary tank when relative motions of said tank and the inertia mechanism are imparted, and means for centering the inertia mechanism comprising a plurality of crossed leaf springs having aligned apertures at their intersections, said inertia mechanism having a portion projecting through said aligned apertures.

2. In fuel feed apparatus a supply tank, an auxiliary tank at a higher level than the supply tank, and vibration operated pumping mechanism for drawing liquid from the supply tank into the auxiliary tank, including an inertia mechanism freely movable within the auxiliary tank, a spring normally spacing the inertia mechanism from the floor of said tank, and means for damping the vibrations of said inertia mechanism comprising a plurality of crossed leaf springs secured to the tank and having aligned apertures at their intersections, said inertia mechanism having a guide rod arranged to project through said apertures.

In testimony whereof, we affix our signatures.

CHESTER H. BRASELTON.
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